Defense Contract Property Control Systems Analysis Primer
By Professor Douglas N. Goetz, Ph.D., CPPM, CF

MODULE 5

Statistics & Sampling

By the end of this module, you should be able to:
- Prepare a random sample number list

By completing the lesson, you should be able to:
- Define the make up of a population

- Determine a sample size using the "Old" DoD Property Manual

- Select/choose random sample numbers from the Random Sample Number Table

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STATISTICS

Well, finally we get to some discussion about statistics! A really amazing field, and one that everyone, I REPEAT, EVERYONE NEEDS TO KNOW ABOUT AND UNDERSTAND! Why? Because every professional today needs to have an understanding of statistics that goes well beyond the common knowledge of the mean, median and mode. You read the newspapers everyday and there are statistics cited. You read a magazine and there are data (Tiny little note: Data is plural, Datum is singular - remember that!) reported. Within those reports you might find discussions of a standard deviation, correlational analyses, multiple regression, even factor analysis. Do you need to know how to compute these items? Not necessarily - you can use a calculator or a computer to do that. But, you do need to know what they "**mean**" (No pun intended!). You do have to understand their underlying principles and usage of the various and sundry equations. An excellent text that I would recommend for every PA is entitled Statistics A Spectator Sport by Richard M. Jaeger, published by Sage publications, Newbury Park, NJ. It is a brilliant book in that it does not use a single formula or mathematical equation. It is purely descriptive in nature and explains, in English, the meaning and use of statistics.

Though we are of the belief that every PA should have had courses in statistics such may not be the case today. Therefore, we are going to attempt to teach you just a few of the basics. So let's try this part together.

INFERENTIAL STATISTICS - We see a lot of data coming across our desks everyday. We see loads of numbers. But, sometimes we have to go beyond those numbers. We have to make inferences; we have to infer something from the number we do have about numbers we don't have. When we perform our system analysis we have a population or populations that we are going to test or audit or analyze. We defined the term population earlier in this paper as "An aggregation of documents, records, assets, or

actions selected for review due to common characteristics. Also known as a "lot." Generally we think of populations as people. But in our case a population usually consists of inanimate objects, e.g., Government property, records, automated record keeping systems, etc. Now, it would be impossible for us, in most cases, to review every single record in the contractor's operation. There is just no way for us to do that. Rather, we break our system analysis into segments and for each of these segments we determine a population and from that population we pull a **SAMPLE**. From this analysis of the **SAMPLE** we make inferences about the **LARGER POPULATION** from which the **SAMPLE** was selected.

O.K., let's take this slowly for a minute and see what it says.

      STEP # 1   - We determine our population subject to analysis - the population is determined by items having **COMMON CHARACTERISTICS** (We will have more information on selecting a proper population later in this paper.

      STEP # 2   - We select a sample from this population.

      STEP # 3   - We analyze/study the sample for the criteria and make a determination regarding the sample.

      STEP # 4   - We reach a generalizable conclusion from the sample as to the population from which the sample was taken.

"Well, that sounds easy enough to do. I can do that. Just get a bunch of the documents together and look at a few of the documents from that bunch and if I find any errors the contractor is unsatisfactory. "

"Right?"

"Welllllll, not exactly! We need to go further in our discussion of selecting a **POPULATION** and this new concept about selecting a **SAMPLE**."

SELECTING POPULATIONS
[NOTE: EXTENSIVE INFORMATION IS PROVIDED TO THE PA IN APPENDIX A OF THIS REFERENCE REGARDING THE SELECTION OF PROPER POPULATIONS FOR EACH FUNCTION/FUNCTIONAL SEGMENT.]

The proper selection of a population for analysis is one of the most critical steps in the performance of a system analysis. Properly framing the population **MUST** be carefully performed otherwise the results that you obtain may not be applicable or generalizable. How may you frame a population? Let's talk about certain techniques. First thought - it depends on what you are measuring. A common usage of verbiage in this area is that of "transactions."

Many of the functions that we review during the system analysis are based upon types of TRANSACTIONS that have occurred. For instance, the function of acquisition is to determine whether acquisitions, purchases, made over a period of time have been adequate. Notice that you have an ACTION occurring and these ACTIONS are occurring over a period of time. TRANSACTIONS are taking place. The function of receiving would also be considered a transactional functional area. We are checking the adequacy of the receiving TRANSACTIONS or ACTIONS that have taken place. This is one method used to establish a population. The transactions are one of our drivers for selecting a population.

O.K., then we use all acquisitions right? Well, not exactly. We need to more clearly define our TIME FRAME for covering the transactional items that we have selected as the first defining parameter for our population. In the "old Supplement 3" there was the allowance to go back for a period of ninety days. In other words you would select, as your population, those acquisitions that had occurred in the past ninety days. If your population was not sufficiently large in size you could increase this time frame another ninety days, repeating this action for another ninety days and again until you reached the time frame of one year. THIS NINETY DAY TIME FRAME FOR SELECTING YOUR POPULATION NO LONGER EXISTS!!! The "Old" DoD Property Manual (And remember that this document has been rescinded) requires that you use as your time frame ONE YEAR OR BACK TO THE LAST SURVEY - whichever is less.

It appears then that there are two parameters that drive the selection of transactional functions: the types of transactions that are occurring and the timeframe during which they occurred. Ahhh, but there is one other parameter - the functional segment or process segment that is subject to review. The functional segment is structured as a subelement under a function and therefore may help you determine how to properly frame your population. The functional segment may be driven by the type of property, either origin (GFP Versus CAP), or classification (Material, Special Tooling, Special Test Equipment, Facilities, or APP), or even the purpose of the property.

Generally, auditors, for example Certified Public Accountants, deal only with transactions and transaction cycles. For example some of the major classes of transactions consist of:
> Sales
> Purchases
> Cash Receipts
> Cash Disbursements and
> Production.

But for the world of Government property, in addition to "Transactional" functions and functional segments, there may be functions whose populations are non-transactional. This is where we do not measure transactions over a time frame but rather test other parameters or "Attributes." For example, the function of storage. How would we frame our population? Would we ask the contractor to show us all transactions that have taken place in the storage areas? Wait a minute - what transactions in the storage area? There is receiving, there is issuing, but these are not the function that we are reviewing which is

storage. We are auditing the actual storage areas for housekeeping, etc. Our population here would consist of all locations where property is stored! For this non-transactional function, or function where we are testing for attributes, I am not concerned with the transactions that may have occurred in the areas where property has been stored. Rather, I am concerned with the actual locations where property is stored. We could do the same with the function of Records and other functions and functional segments where we determine our population not based upon transactions but rather on the handling of the property at a certain time. We will discuss this distinction later under each of the functions/functional segments used for our system analysis.

SAMPLING

Let us assume then that we have selected our population for a Function or Functional Segment. And through the defining of this population under this function we have a collection of documents. Let's say we are using the function of "Records," the functional segment of "All Records of Government Property." We have a computerized listing, provided by the contractor of all special tools in the contractor's possession. Or we might have a manual record system, a card file. Here we have a population. Both of these items, the computerized listing and the manual system have 1467 items listed.

"How then do we select our sample?"

"Simple - I'll just select maybe five or ten percent of the records."

"You will? Wait a minute! Ten percent of 1467 is 147 records. Are you going to have the time to review 147 records?"

"Well maybe I'll just do five percent".

"Great, now you'll only review 74 items."

"O.K., I get your point. Then how do I know how many items TO select as my sample?"

"Ahhh, am I glad you asked."

There are a number of different sampling methods available, probabilistic and non-probabilistic. Under probabilistic there is random sampling, replacement versus nonreplacement sampling, and systematic selection.   Under nonprobabilistic there is block sampling, haphazard selection, and judgmental (Yeah, we'll talk about this later) to name just a few. Generally, we use a probabilistic method, using nonreplacement random sampling. But, in some cases you may use judgment sampling, in some cases you may use systematic selection and even another form of nonstatistical sampling - purposive or purposeful sampling. These will be discussed later and under what conditions they may be used.

In regard to Statistical Sampling the Government Accountability Office (GAO) provides its direction for sampling. IN GAO 07-731G Government Auditing Standards it states in paragraph 7.63, "**7.63** When sampling is used, the method of selection that is appropriate will depend on the audit objectives. When a representative sample is needed, the use of statistical sampling approaches generally results in stronger evidence than that obtained from nonstatistical techniques."

The number of items to select from a population was computed for you in the "Old" DoD Property Manual 4161.2-M. You can find this table in Appendix B. It is also contained in the LIBRARY for this course. It is referred to as a double sampling plan and has a 90 percent confidence level. Let's digress just for a minute and talk about two of these terms: the double sampling plan and the confidence level.

Confidence level

Flesher (1996) gives an excellent description of "confidence level" or "reliability." He states "The confidence level or reliability is the probability that a sample will accurately represent the population from which it was selected. For example, a sample with a 95 percent confidence level would be said to accurately reflect the population 95 percent of the time. That is, if 100 samples were selected from the population, 95 of those samples would accurately reflect the population."

The Government, through the "Old" DoD Property Manual, has already established for us that the confidence level we will use is at **90%.** I have taken the liberty of including TWO OTHER Sampling tables with different confidence levels. One at a 95% confidence level and one at a 97% confidence level. These were designed SPECIFICALLY for the DoD Property community through a research report prepared for the Defense Contract Administration and Services organization – the old DCAS, DCASR and DCASMA operations – the precursor for Defense Contract Management Command (DCMC) and the Defense Contract Management Agency (DCMA). The origins of these organizations can be traced back to Secretary of Defense McNamara under Project 60 – but that is a whole 'nuther paper!

In other endeavors higher confidence levels may be required; Levels such as a 95% confidence of rejecting lots having 10% or more defectives or a 97% confidence of rejecting lots having 10% or more defectives. Notice that the Government is not asking for a 100% confidence level. Rather, it has consciously determined that 90% is an acceptable confidence level for the work being performed by the contractor. If we were doing Quality Assurance work for the Nuclear Navy that confidence rate would be far higher. Why? Because there would need to be a far greater degree of compliance at that higher rate. The Government has established what it believes to be an acceptable rate for us. This confidence rate is then one of the drivers for the number of samples that we select.

Double sampling plan

There are a number of different sampling plans available also. Under the old DFARS Sup. 3, (You know, back in the old days when I was a working PA) prior to 1983, there was the requirement for a single sample to be drawn from the population. This entailed, for many large populations, that 65 samples be drawn!!!

This was extremely time-consuming and though it provided a correct statistical significance to the findings and did provide a valid acceptance/rejection rate there were more efficacious methods available. If you review some of the early statistics and auditing texts, some of which are referenced throughout the paper, you will find that double sampling did not come along until the late sixties, the early seventies. Prior to this, the single sampling technique was most frequently used. Through the academic research conducted by the mathematicians and statisticians a double sampling plan was found to provide the same reliability and validity as a single sample and one could save time and money using that double sampling plan. I thanked my lucky stars when the powers that be allowed the use of double sampling plan in 1983. For those of you who remember selecting and reviewing 65 samples, my hat goes off to you. The current sampling plan is superb in comparison.

The double sampling plan allows for the use of a smaller sample size with no reduction of the confidence level. If you really are interested I can give you the formulae for computing the sample size under a double sampling plan? For those of you interested in the formulae here are some basic items:

(1) Hypergeometric
　　Distribution

$$P(x) = \frac{\binom{D}{X}\binom{N-D}{n-x}}{\binom{N}{n}}$$

N = lot size
D = number of assumed defects in lot
n = sample size
x = number of defects in sample
P(x) = Probability that n sample will have x
　　　　defectives and is selected from lot of size N
　　　　with D defects.

(2) Binomial Distribution

$$P(x) = \binom{n}{x} p^x (1-p)^{n-x}$$

p = population fraction defective,　0 =< p <=1

(3) Double Sampling Formula

$$P_a = \sum_{x=0}^{c_1} P(x) + \sum_{x=c_1+1}^{r_1-1} [P(x) \sum_{j=0}^{c_2-x} P(j)]$$

P_a = probability of lot acceptance
c_1 = acceptance number for first sample
r_1 = rejection number for first sample
c_2 = acceptance number for second
sample (Defects in <u>both</u> samples
must not exceed this number)
j = number of defects in second sample

At this point I imagine that all of you are saying " Thank you for sharing this with us but we really didn't want to see all of these formulae. This is TOOOO much information!"

"No? O.K., see if I care that you don't want to do some algebraic equations!"

Suffice it to say that those wonderful people with the green eyeshades sat down and computed for us the number of samples that we need to select. All of these sample sizes are set forth in the references for this course. The double sampling plan requires the selection of two samples. Vance and Neter (1956) state the following in regard to double sampling plans,

> Another type of sampling plan involved two possible stages of decision making. Initially only part of the total sample is selected, and a final decision of acceptance or rejection is reached at once if the sample indicates exceptionally good or poor quality. Otherwise the remainder of the sample is selected and a final decision whether to accept or reject is made at that time. This is called a double sampling plan because it may involve two sampling stages.

"Well, tell me what is the sample size for the population of <u>1467</u> records that we are going to review?"

THE ANSWER: <u>34</u>

"Sure, that was easy. So all I need to do is select the first 34 items from the bunch of records and review those. Right?"

"Well, not exactly. Because another fundamental issue in terms of inferential statistics is that the sample must be **<u>RANDOM!!!</u>**"

<u>RANDOMNESS</u>

"Wait a minute. You didn't say anything about that before! I know where the problems are. I can select any items I want to! Why do the items selected have to be random?"

"Because inferential statistics is based upon some very strict rules." Carmichael and Willingham (1989) define random selection as "... a sample that is selected in such a way that every item in the population has an equal chance of being selected" (p. 247. Arens and Loebbecke (1988) state,

> A random sample is one in which every possible combination of items in the population has an equal chance of constituting the sample. The only way an auditor can be confident a random sample has been obtained is by adopting a formal methodology that is designed to do this (p. 391).

Random sampling helps to protect against and preclude the inherent **BIAS** that most of us have. Very simply, by using random sampling you apply the rules of statistics and the contractor cannot claim that your sample is biased and therefore not generalizable to the larger population from which it was selected. Block sampling, where you just wanted to pick the first 34 items from the list, even though it is not biased, is also unacceptable. Carmichael and Willingham (1989) state,

> Certain selection methods that have been used by auditors in the past are methods that cannot be expected to produce representative samples. This means these methods are not acceptable to statistical or nonstatistical audit sampling.

What is one of these methods? Block selection!

"Well, how can I be sure my sample **IS** random?"

The "Old" DoD Property Manual provided Appendix C for just such a purpose – and every statistics book has a RANDOM NUMBER TABLE. There are other methods, such as the computer programs that are available. Even MS-Excel ™ has this ability. But, you may not have access to a computer all the times so let's walk you through selecting a random sample using Appendix C and discuss the concepts of starting point, column, row and routing.

> **STOP! DO RANDOM NUMBER SAMPLE EXERCISE!**

Now that you have all muddled through the process of using the random number tables in Appendix C let me provide some concrete direction as to "How" the tables may be used. This is nothing new. Direction was contained in the old DAR/ASPR Supplement No. 3. I have copied that DIRECTION as to how to use the table – and I hope that this explains to you the actual PROCESS of selecting Random numbers. It stated,

(c) Random Number Table. The following information is a guide which may be used in drawing a sample with a table of random numbers. Other randomization techniques may be applied provided they are defined beforehand in the property administration survey plan and exhibit clear protection against bias. Care must be exercised to assure that the number of items in the lot is not overestimated so as to avoid selection of random numbers greater than the lot. For example, **if the lot is 9,000, only numbers lower than 9,001 shall be selected**. Using a random table to draw a random sample requires four steps which are:

(i) First Step: A pattern must be established between the numbers in the table and items in the lot to be sampled. It is possible to use the whole random number or any portion thereof. For instance, the number 18,967 may appear in the table. If the lot size is more than 99 but less than 1,000, a three digit number is required and either the first three digits 189 or the last three (967) may be used. If the lot size is more than 999 but less than 10,000, a four digit number is required and either the first four digits (1,896) or the last four (8,967) may be used. Once this pattern has been established, it must be consistently used throughout the sample selection process.

(ii) Second Step: A procedure for selecting the numbers from the table must be selected. Any systematic path for going through the table, if the path is clear and does not cross over or reuse any number previously used, is acceptable. It is possible to proceed across rows, down columns, diagonally, clockwise, counter-clockwise, or in the same combinations of these methods; however, it is usually desirable to choose a simple pattern and go down columns or across rows.

(iii) Third Step: The starting point in the table shall be selected at random. The most used method is to open the table of random numbers to any page and to use the number upon which the pencil point falls as the starting point.

(iv) Fourth Step: Beginning at the starting point and proceeding through the table as planned in the Second Step, record the numbers found in succession in the table, using all or part of the number as planned in the First Step. Duplicate numbers shall be skipped. The selection process shall be continued until the required sample size is drawn.

Number taken from the random table shall be arranged and recorded in
numerical order.

If we were to review texts on sampling we would find similar directions. The process of
using random number tables is fairly uniform and consistent.

CORRESPONDENCE BETWEEN THE RANDOM NUMBERS AND THE POPULATION ITEMS

Excellent! You have successfully selected a set of random numbers from a random
number table. Pragmatically I recommend that in the future you use a nifty little web site
call the RANDOMIZER!!! It is found at WWW.RANDOMIZER.ORG. It is a heck of a lot
easier and there is nothing wrong with the use of a computer to perform that job. Brink
and Witt (1982) advocate the use of computers in the audit process. They state, "There
are various statistical sampling programs available in the software packages. Some
commonly used ones are as follows:
1. Random Number Generators ...
2. Determining Sample Size ...
3. Appraisal of results."
Folks, putting it simply, computers are here to stay. They are not just a passing fancy like
the car and the telephone but are powerful tools developed for your use.

So you have in front of you 34 random numbers. [NOTE: Really you should have 68
random numbers as you must pull both samples, i.e., the double sample numbers, before
selecting those items from the population. Otherwise, when you go back to pull another
sample all items in the population must stand the chance of being selected and there is
that probability that you will select an item that you have tested previously and that was
already found deficient. This is the distinction between replacement and nonreplacement
sampling. The sample item number can only be selected once! Therefore we use a
nonreplacement method.]

So, what do you do with those 34 (68) numbers? You establish correspondence between
the random numbers and the population items. If it is a computer listing this should be a
fairly easy task. Ahhh, but your listings may not always be numbered. What do you do
now? Vance and Neter (1956) state, "In some cases auditing populations are not already
numbered... In these cases numbers may be assigned to the items so that random
numbers can be used" (p.123).

I know, I know, this is time consuming and laborious. If you can come up with a better way
let me know. Otherwise you have to number the items in some sequential fashion. Even
the old, aforementioned Sup. 3 stated,

If the units of the lot to be examined are already consecutively numbered,
the units having the numbers corresponding to those taken from the random
table become the sample units. Otherwise, the sample units shall be found
by counting down to the numbers taken from the random table.

Therefore, if your population is a set of record cards you will have to sequentially count out the cards and assign numbers to those cards, if not already done, for the purposes of linking a sample number to an item in the population.

GENERALIZABILITY

"What does all of this work do for us?" Well, from the standpoint of inferential statistics it provides us a mechanism by which we determine and define our population and attributes or transactions that we wish to audit, select our random sample numbers and correspond those sample numbers to our population, thereby select our sample, record and analyze the data from that sample, reach some conclusions and then, hopefully, our conclusions would be generalizable to the larger population from which the sample was taken. Notice, that we need not review every item in the population. Rather through inferential statistics we can review only a small portion, a **RANDOM SAMPLE** of the population and reach some conclusions about the entire population from which the sample was drawn. Pretty nifty trick, huh? Does it work? Absolutely!!!

But only if the statistical underpinnings are properly applied.

CLASSES OF CRITERIA

[NOTE: REMEMBER THAT THE "OLD" DOD PROPERTY MANUAL 4161.2-M HAS BEEN RESCINDED. THEREFORE THE FOLLOWING INFORMATION IS PROVIDED TO GIVE YOU A BASELINE AS TO PAST PERFORMANCE METHODS. ONCE AGAIN, YOU ARE TO FOLLOW YOUR AGENCY POLICY and GUIDELINES IN APPLYING THESE CONCEPTS.]

The "Old" DoD Property Manual specified that for each criteria there is a "CLASS" designated. What relationship does this have to Inferential Statistics, and to all of the information just discussed? These classes dictate, for the PA, whether statistical sampling shall/must (Command/imperative) be used or some other form of nonstatistical sampling may be applied. There were three classes listed at the top/beginning of Appendix A in the "Old" DoD Property Manual. These are:

CLASS I   STATISTICAL SAMPLING

CLASS II   JUDGMENT SAMPLING

CLASS III   PURPOSIVE SAMPLING

This requirement established for the PA that he/she <u>must</u> use statistical sampling for any criterion designated as a CLASS I criterion. The PA <u>may</u> use judgment sampling on any CLASS II criteria or he/she may upgrade that CLASS II criteria to a CLASS I criteria. Notice that the "Old" DoD Property Manual had this allowance as a note to the heading of

Appendix A. It states "A CLASS II sampling may be changed to a CLASS I sampling by the PA dependent upon the circumstances and situations affecting the analysis."

Great, so this means that I could also change a CLASS I to a CLASS II. NO! NO! NO! There WAS **NO** allowance to "downgrade" a criterion that requires statistical sampling to judgment sampling. There **WAS** the allowance to "upgrade" from a judgment sampling to a statistical sampling.

COMMENTARY
Since the "Old" DoD Property Manual was rescinded and no further guidance has been issued by DoD my first recommendation is that you following your agency's policy and guidance. Where none has been issued I would encourage you to apply the above discussed concept and align the PROCESS CRITERIA along the lines of which criteria require statistical sampling and which require or would allow judgment sampling.

JUDGMENT SAMPLING
We have delved into the world of statistical sampling quite heavily, but we haven't discussed the use of judgment sampling. What exactly is judgment sampling? In a classic text Vance and Neter (1956) describe judgment sampling as,

> A Judgment ... sample is one where the selection of specific sample items depends to a large extent upon individual judgment, or where judgment decisions are made about portions of the population for which the sample did not obtain the necessary information... Judgment samples may at times be quite useful, but their results cannot be evaluated on the basis of the sample by statistical methods (p.17).

[NOTE: Everything old is new again! These guys talk about Deming in the present tense even though the literature they cite is over forty years old. AMAZING!]

Arens and Loebbecke (1988) also provide input in this area. They state,
> Many auditors believe that it is desirable to use professional judgment in selecting sample items for tests of transactions. When sample sizes are small, a random sample is often unlikely to result in representative samples. ...judgment methods of selection are often useful and should not be automatically discarded as audit tools. In many situations, the cost of unbiased or more complex selection methods outweighs the benefit obtained from using them.

But, they also issue a warning similar to Vance and Neter, "It is improper and a serious breach of due care to use statistical measurement techniques if the sample is selected by the haphazard, block, or any other nonprobabilistic approach" (p.397).

The "Old" DoD Property Manual uses CLASS II - Judgment Sampling only in those areas where populations may not be that large, criteria are not that critical but still necessary, or where the cost of using statistical methods would far outweigh the benefit reaped by either

the Government or the contractor. How then should a PA select that judgment sample? Well, in a number of ways. In some instances all items might be selected, e.g., the Process of Storage. I would not statistically sample the storage areas for housekeeping. It would be more cost effective to use judgment to test those areas. This is just one example. But, as stated before there may be instances where, though a criteria is listed as a CLASS II criteria I have the option of "upgrading" that criteria to a CLASS I and using statistical sampling.

If you were to peruse the entire Appendix A you will notice that there are no criteria with a CLASS III rating.   Why is this included?   We will discuss the use of PURPOSIVE/PURPOSEFUL SAMPLING later in this text. But, suffice it to say, it also is a nonstatistical method and needs to be handled and used very judiciously.

NEW DEVELOPMENTS

With the publication of the new Government Property clauses and policy of FAR Part 45 in May/June of 2007 the Government has moved away from the prescriptive regulatory application and moved towards the use of Voluntary Consensus Standards (VCS) and Industry Leading Practices (ILP).

Throughout this document I have made reference to numerous "OLD" documents. I have referenced the old Armed Services Procurement Regulations, the ASPR.
I have also referenced the old Department of Defense Manual for the Performance of Contract Property Administration, 4161.2-M, which I have referred to as the "old" DoD Property Manual. These documents are dead – but they still have utility. The have utility for contracts awarded BEFORE June of 2007 where they are bound by the old regulations (And which have NOT been modified to incorporate the NEW GP Clauses) and their surveillance/auditing by you the Government PA.

These documents DO NOT have complete applicability to the NEW GP Clauses!!! Care must be taken to use those sections that CAN be used. Care must be taken to NOT impose any of these requirements on the contractor – as this manual is NOT contractually binding upon the contractor.

There are portions of the "old" DoD Property Manual mentioned in this chapter that STILL have applicability – those portions include the SAMPLING PLANS, RANDOM NUMBER TABLES – and selection of RANDOM NUMBERS.

As we the Government have tasked the contractors to embrace VCSes and ILPs so too WE, the Government, must embrace VCSes and ILPs! I would recommend that you reference the GAO Yellow Book that we discussed earlier in the chapter. I would also recommend that you read the Defense Contract Audit Agency Manual, DCAAM 7640.1, in regard to SAMPLING!!! It has great depth and detail from a number of different perspectives – and will allow you to grow intellectually as an auditor in the field of Government Property Administration and Management.

APPLICATION OF STATISTICAL SAMPLING AND JUDGMENT SAMPLING UNDER THE POTENTIAL AUDIT CRITERIA USED FOR THIS CLASS

Later in this class you will reference a document entitled POTENTIAL AUDIT CRITERIA. You will notice that it is VERY similar in feel and flavor to the "Old" DoD Property Manual Appendix A – the listing of Criteria for performing a Property Control System analysis (Yes I said PCSA versus PMSA – as I am referencing the OLD document).

In the NEW AUDIT CRITERIA you will find that there is no column tasking you to use either a Class I or Class II process, i.e., statistical sampling or judgment sampling. Why? Because there are too many unknown variables! Huh? What?

Seriously, contractors are now tasked to use VCSes and ILPS. I cannot create an Audit Criteria for variables that I do not know. Therefore, you, the Property Administrator, are now going to have to determine which form of testing -- statistical sampling or judgment sampling, is applicable to the criteria you are testing! Look, you are the expert in that contractor's PMS and the performance of the PMSA! We are asking you to intelligently decide, based upon your INSIDER'S PERSPECTIVE of that contractor WHEN to use a STATISTICAL APPROACH, and WHEN to use a JUDGMENT APPROACH for determining how to sample. I know this isn't easy, but following the principles of Total Quality Management in this case it definitely is one of those items that should be flowed down to the expert in the field versus having the Pentagon tell you how to do your job.

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